

Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) **EP 0 660 421 A3**

(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:  
05.11.1997 Bulletin 1997/45

(51) Int. Cl.<sup>6</sup>: **H01L 27/146, H04N 1/031**

(43) Date of publication A2:  
28.06.1995 Bulletin 1995/26

(21) Application number: **94120730.0**

(22) Date of filing: **27.12.1994**

(84) Designated Contracting States:  
**DE FR GB IT NL**

(30) Priority: 27.12.1993 JP 331690/93  
22.08.1994 JP 196640/94  
22.08.1994 JP 196641/94  
22.08.1994 JP 196642/94  
22.08.1994 JP 196643/94  
22.08.1994 JP 196644/94  
22.08.1994 JP 196645/94  
22.08.1994 JP 196648/94  
22.08.1994 JP 196670/94  
16.12.1994 JP 313392/94

(71) Applicant:  
**CANON KABUSHIKI KAISHA**  
Tokyo (JP)

(72) Inventors:  
• Kaifu, Noriyuki,  
c/o Canon Kabushiki Kaisha  
Ohta-ku, Tokyo 146 (JP)

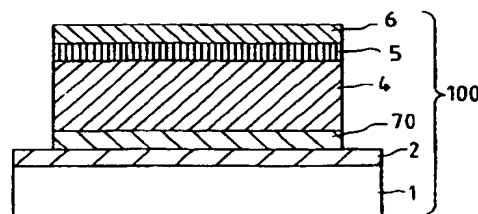
- Mizutani, Hidemasa,  
c/o Canon Kabushiki Kaisha  
Ohta-ku, Tokyo 146 (JP)
- Takeda, Shinichi,  
c/o Canon Kabushiki Kaisha  
Ohta-ku, Tokyo 146 (JP)
- Kobayashi, Isao,  
c/o Canon Kabushiki Kaisha  
Ohta-ku, Tokyo 146 (JP)
- Itabashi, Satoshi,  
c/o Canon Kabushiki Kaisha  
Ohta-ku, Tokyo 146 (JP)

(74) Representative:  
**Pellmann, Hans-Bernd, Dipl.-Ing. et al**  
Patentanwaltsbüro  
Tiedtke-Bühling-Kinne & Partner  
Bavariaring 4  
80336 München (DE)

(54) **Photoelectric converter, its driving method, and system including the photoelectric converter**

(57) A photoelectric converter of a high signal-to-noise ratio, low cost, high productivity and stable characteristics and a system including the above photoelectric converter. The photoelectric converter includes a photoelectric converting portion 100 in which a first electrode layer 2, an insulating layer 70 for inhibiting carriers from transferring, a photoelectric converting semiconductor layer 4 of a non-single-crystal type, an injection blocking layer 5 for inhibiting a first type of carriers from being injected into the semiconductor layer and a second electrode layer 6 are laminated in this order on an insulating substrate 1.

*FIG. 4A*





European Patent  
Office

## EUROPEAN SEARCH REPORT

Application Number  
EP 94 12 0730

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 4 575 638 A (OKUMURA FUJIO) 11 March 1986  * abstract; figures 1-4,8,12 * * column 1, line 55 - column 2, line 11 * * column 3, line 4 - line 35 * * column 5, line 7 - line 22 * * column 6, line 57 - column 7, line 18 * * claims 1,2 *	1,3-5,7, 8,10, 17-21, 27,30	H01L27/146 H04N1/031
A	---	34	
X	US 5 225 706 A (BERGER JEAN L ET AL) 6 July 1993 * abstract; figures 1,3,4 * * column 1, line 52 - column 2, line 19 * * column 5, line 17 - column 6, line 22 * * claim 7 *	1,2,4,5, 27,34	
A	---	25,26,35	
A	EP 0 296 603 A (CANON KK) 28 December 1988 * abstract; figures 9,10,18 * * column 1, line 45 - column 2, line 6 * * column 4, line 32 - line 45 * * column 6, line 44 - line 59 * * column 9, line 54 - column 10, line 9 * * column 12, line 25 - line 59 * --- -/--	1,3-24, 27,34	TECHNICAL FIELDS SEARCHED (Int.Cl.6)  H01L H04N
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>29 August 1997</b>	Examiner <b>Visscher, E</b>
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03/82 (P04C01)



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 94 12 0730

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	EXTENDED ABSTRACTS OF THE 15TH CONFERENCE ON SOLID STATE DEVICES AND MATERIALS, TOKYO, JAPAN, 30 AUG.-1 SEPT. 1983, ISBN 4-930813-04-2, 1983, TOKYO, JAPAN, JAPAN SOC. APPL. PHYS, JAPAN, pages 201-204, XP002039214 OKUMURA F ET AL: "Amorphous Si:H linear image sensor operated by a-Si:H TFT array" * figure 4 * * paragraph 3 *	1,4,5,7, 8,10, 17-21	
A	PATENT ABSTRACTS OF JAPAN vol. 013, no. 428 (P-936), 25 September 1989 & JP 01 161251 A (FUJITSU LTD), 23 June 1989, * abstract *	1,6	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
Place of search THE HAGUE		Date of completion of the search 29 August 1997	Examiner Visscher, E
<p><b>CATEGORY OF CITED DOCUMENTS</b></p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons</p> <p>&amp; : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03.82 (P04C01)

**This Page Blank (uspto)**